

Alabama Life Research Institute

Four-Year Strategic Plan

2020 - 2024

Mission Statement

The Alabama Life Research Institute (ALRI) is a university-wide institute at The University of Alabama that serves as a focal point for interdisciplinary biopsychosocial research that seeks to investigate the human condition at all levels, from the molecular to the environmental, with the goal of improving the lives of the people of Alabama and beyond. The ALRI collaborates with other UA centers, other institutions, health care corporations, governmental agencies, and community-based organizations.

ALRI will achieve this mission by:

- Expanding the university's research programs related to life science and health, broadly defined.
- Supporting interdisciplinary collaborations that tackle big systemic research problems and themes that UA is uniquely positioned to pursue and that are impactful.
- Providing necessary resources to make big science possible on campus. This includes working with the Institute of Data Analytics and the College of Engineering to create statistics/biostatistics, big data/AI, and health data analytics research cores that support large scale projects.
- Engaging our greater local and Alabama communities in mutually beneficial research and outreach programs.
- Expanding collaborations between our research faculty and industry.
- Creating training programs and initiatives that develop necessary skills of students and researchers to produce world-class research related to our mission.
- Collaborating with ORED to develop a strategic communication and marketing plan to promote the work and impact of ALRI and affiliated centers.

ALRI will initially pursue the following major Research Themes in its Four-Year Strategic Plan:

- Rural Health and Health Disparities
- Human Neuroscience
- Biomedical Sciences
- Environmental Sciences and Health
- Implementation Science

Additional themes may be added in the future based on emerging opportunities and faculty support.

Theme 1: Rural Health and Health Disparities

Alabama is the 6th poorest state in the country and has poor health outcomes, having the 5th highest cancer mortality rate and 3rd highest maternal mortality rate. Our rural communities tend to have poorer health outcomes along with problems with access to care.

The mission of the Rural Health and Health Disparities theme is to conduct research that uncovers the mechanisms responsible for disparate health outcomes, and to develop and implement interventions to improve the health of all Alabamians. UA currently has a significant number of researchers across campus that focus on rural health and health disparities including one of our affiliated centers - the Institute for Rural Health Research in the College of Community Health Sciences. The ALRI will provide support to existing groups and expand ongoing efforts across all Colleges on campus.

Goal 1.1. Pursue transformative and interdisciplinary initiatives that take a translational approach connecting basic science to clinical science to better understand, develop, and deploy interventions that address the health issues that significantly impact rural citizens. Examples include, but are not limited to: maternal and infant health; cancer survivorship; behavioral health, child development and aging; and cardiovascular disease. *(Metrics: Number of federal grants and contracts)*

Goal 1.2. Create federally funded research centers that focus on improving the health of rural residents. *(Metrics: Number of federal grants and contracts, publications and a P50 award).*

Goal 1.3. Develop a community engagement plan to support state-wide interests in rural health and health disparities. Because life research requires community involvement we must ensure that UA researchers are appropriately trained and culturally competent to represent ALRI and UA well and that they keep the community informed of research outcomes that impact their lives. *(Metrics: Improved reputation and increase in mutually-beneficial collaborations with community partners)*

Goal 1.4. Expand telehealth in rural Alabama. With the closing of rural hospitals and a shortage of healthcare providers in rural Alabama it is more important than ever that UA helps to fill the gap. Expanding telehealth is critical to increase access to quality healthcare. ALRI will continue to collaborate with the College of Community Health Sciences and the College of Engineering to expand telehealth in the state including remote sensing for older and chronically ill patients and synchronous care via mobile devices and home computers to allow direct services in patients' homes. *(Metrics: Increase in grant applications and collaborations with corporate entities to support increased broadband coverage and increased access to telehealth equipment and services.)*

Goal 1.5. Create training programs and initiatives that develop the necessary skills of students and researchers to produce world-class research related to Rural Health and Health Disparities. *(Metrics: Number of training grants and trainees)*

Goal 1.6. Recruit and name a UA faculty member to lead the Rural Health and Health Disparities theme under ALRI.

Goal 1.7. Increase federal funding to support Rural Health and Health Disparities research at UA, especially from the National Institutes of Health. *(Metrics: Increase in grant and contract applications)*

Goal 1.8. Work collaboratively with ORED, the Colleges and the Provost to recruit additional faculty in Rural Health and Health Disparities at UA that will assist in moving the theme forward. *(Metrics: Faculty hires)*

Theme 2: Neuroscience

Brain disorders account for more suffering, cost, and long-term care than all other disorders combined. Alabama has high rates of neurological disorders including Parkinson's disease, dementias including Alzheimer's, stroke, psychiatric disorders and neurodevelopmental disorders including autism. Many of these neurological conditions disproportionately affect individuals living in rural areas. ALRI has a unique opportunity to lead in the area of human neuroscience.

The mission of the Neuroscience theme is to uncover the mechanisms that underlie neurodevelopment, typical and atypical functioning, and disorders. The university currently has a number of faculty who study a wide range of such topics including child development, aging, autism, learning and addiction. Human neuroscience by its nature is interdisciplinary and involves researchers from psychology, biology, education and engineering.

Goal 2.1. Create a Magnetic Resonance Imaging (MRI) research center. MRI allows for the study of the human brain. UA has faculty who will immediately make use of the MRI center to study: autism and youth development, aging (including dementia and Parkinson's Disease), substance abuse, concussion, and learning. MRI is computationally demanding and is interdisciplinary in nature, requiring collaboration between neuroscientists, psychologists, engineers, and computer scientists. Therefore, we will also engage the College of Engineering and the College of Business faculty to work in the areas of methods development and computational neuroscience including big data analytics. *(Metrics: Acquire a MRI scanner and create a sustainable, self-funded neuroimaging research center).*

Goal 2.2. Increase the number of researchers who use mammalian animal models on campus. While our primary goal will be growing human neuroscience, it is essential that we also have researchers working in the pre-clinical space in order to perform highly innovative translational research. Growing our faculty who work in rodent models to study autism and aging, for example, will allow for researchers who work at the clinical and pre-clinical levels to collaborate and learn from each other as well as test hypotheses developed in one model system in the other. This method will significantly improve the science and lead to innovation. *(Metrics: Hiring researchers who develop and use animal models and increased use of the vivarium).*

Goal 2.3. Work collaboratively with academic programs to grow the neuroscience research footprint at UA by attracting both undergraduate and graduate students interested in neuroscience. *(Metrics: Support academic units in the creation of a neuroscience major that excites undergraduates).*

Goal 2.4. Create training programs and initiatives that develop the necessary skills of students and researchers to produce world-class research related to the Neuroscience theme. *(Metrics: Funded training grants to support graduate students and post-docs and creating undergraduate research programs).*

Goal 2.5. Support existing affiliated research centers related to Neuroscience and support the development of new centers. *(Metric: Expansion of autism research and growth in federally funded projects in the newly created autism center and the creation of a new federally funded human neuroscience center).*

Goal 2.6 Recruit and name a UA faculty member to lead the Neuroscience theme under ALRI.

Goal 2.7. Work collaboratively with ORED, the Colleges and the Provost to recruit additional faculty in Neuroscience at UA.

Theme 3: Biomedical Sciences

The University of Alabama is well positioned to become a leader in Biomedical Sciences with a particular focus on drug discovery and delivery.

The mission of the Biomedical Sciences theme is to develop new therapeutics and delivery methods and to translate these new therapeutics to clinical studies. The theme is multi-disciplinary and brings together current faculty across multiple programs including biology, engineering, chemistry and nutrition science. It will also allow for the recruitment of faculty that who support the mission.

Goal 3.1. Creating a Biomedical Sciences Center where researchers can come together to collaborate and have the resources and facilities necessary to perform cutting-edge research in drug discovery and delivery is a priority for the ALRI. The space for such a center is the second floor of the AIME building. By providing the necessary resources and space for such a center we will be well positioned to develop collaborations with pharmaceutical companies and increase federal funding, especially from the NIH. *(Metric: Hire a world-class drug delivery/discovery expert and create a federally funded center).*

Goal 3.2. Increase the number of researchers on campus using rodent models that are relevant to the key strengths in the Biomedical Sciences at UA. *(Metrics: Increase the number of researchers who develop and use animal models and expand the use of the vivarium).*

Goal 3.3. Increase UA's ability to perform small-scale clinical trials research in collaboration with pharmaceutical and biotechnology companies. *(Metric: Increase UMC's capability of conducting clinical trials).*

Goal 3.4. Collaborate with the Alabama Cyber Institute and affiliated centers and academic departments in mutually-beneficial ways to incorporate AI-driven drug discovery methods.

Goal 3.5. Partner with the Office for Economic and Business Engagement to develop strategic collaborations with pharmaceutical, biotechnology, and medical device companies in the state of Alabama and beyond. *(Metric: Increased collaborations with industry).*

Goal 3.6. Create training programs and initiatives that develop the necessary skills of students and researchers to produce world-class research related to Biomedical Sciences. *(Metrics: increase in grant workshops, undergraduate research programs, and graduate training grants).*

Goal 3.7. Support existing affiliated research programs related to Biomedical Sciences and support the development of new centers.

Goal 3.8. Recruit and name a UA faculty member to lead the Biomedical Sciences theme under ALRI.

Goal 3.9. Increase federal funding to support Biomedical Sciences research at UA, especially from the National Institutes of Health.

Goal 3.10. Work collaboratively with ORED, the Colleges and the Provost to recruit additional faculty in Biomedical Sciences at UA.

Theme 4: Environmental Sciences and Health

The mission of this theme is to understand the cumulative exposures and interactions of environmental toxins that affect health and disease across the lifespan.

Alabama has an abundance of natural resources with several waterways and a gulf coast. These ecosystems are essential to the health and well-being of its citizens. There are regions within the state in which these ecosystems are threatened by pollution. In addition there remains the potential of exposure to toxins such as lead and copper from paint and older pipes.

The Environmental Sciences and Health theme will seek to improve public health by understanding the extent to which and mechanisms by which environmental exposure to pollutants and toxins impact health across the lifespan. This is an inherently interdisciplinary venture which brings together researchers from disparate disciplines including engineering, geology, geography, biology, public health, nursing, anthropology, human development and family studies, and psychology. It also aligns with the goals of the Alabama Water Institute, USGS-HIF and the National Water Center (NOAA) all located on UA's campus.

Goal 4.1. Create an interdisciplinary environmental sciences and health research center. The center will coalesce faculty to define and pursue 3-4 major environmental initiatives that present serious health risks to Alabama and the United States. *(Metrics: increase in collaborative research manuscripts and federal grant and contract submissions)*

Goal 4.2. Work collaboratively with ORED, the Colleges and the Provost to recruit additional faculty in Environmental Sciences and Health at UA. *(Metrics: increased number of faculty focused on Environmental Sciences and Health)*

Goal 4.3. Collaborate with USGS-HIF and the Alabama Water Institute in mutually-beneficial ways to develop research programs related to water security. One such program is a Water Infrastructure Center of Excellence (WICE) at the University of Alabama that monitors water and wastewater systems across the US as well as its impact on human health that uses big data and AI to monitor potential health conditions linked to poor water quality. *(Metrics: increase in collaborative research manuscripts and federal grant and contract submissions)*

Goal 4.4. Collaborate with the Office for Economic and Business Engagement to develop relationships with state, federal, non-profit organizations and industry. *(Metrics: Increased collaboration with the Alabama Department of Public Health (ADPH) and industry)*

Goal 4.5. Create training programs and initiatives that develop necessary skills of students and researchers to produce world-class research related to Environmental Sciences and Health *(Metrics: increase in grant workshops, undergraduate research programs, and graduate training grants).*

Goal 4.6. Support existing affiliated centers and research groups related to Environmental Sciences and Health.

Goal 4.7. Recruit and name a UA faculty member to lead the Environmental Sciences and Health theme under ALRI.

Goal 4.8. Increase federal funding to support Environmental Sciences and Health research at UA, especially from the National Institutes of Health (i.e., NIEHS, NCI, NHLBI, NIMHD, etc.).

Theme 5: Implementation Science

As our communities struggle to address the needs of their residents under resource-constrained conditions, the use of evidence-based strategies in treatment and prevention is even more critical. Implementation science research plays a critical role in optimizing and adapting interventions and the promotion of the uptake of these strategies.

UA has a long history of performing implementation science research with there being experts in nursing, engineering, education, psychology, anthropology, social work, human development and family studies, and criminal justice. The mission of the Implementation Science theme is to expand on that tradition by making UA a world leader, particularly in implementing evidenced based research in rural communities. ALRI currently has research centers that have at their core implementation science; they include the Center for Youth Development and Intervention, the Center for Interconnected and Behavioral Health, the Center for Innovative Research in Autism, the Alabama Research Institute for Aging and the Institute for Social Science Research. These centers in addition to other faculty across campus have expertise in the theory, practice and study of implementation science.

Goal 5.1: Create an interdisciplinary UA Implementation Science collaborative that includes faculty from across campus with an interest in implementing evidence based interventions in health care and community settings. The collaborative will support the development of research to guide the implementation of evidence-based interventions across a range of settings. *(Metrics: Increase in the number of funded projects in the area)*

Goal 5.2: Work closely with faculty in the College of Engineering to implement newly developed technologies in the community, including creating smart home technologies that allow the elderly to age in place or to facilitate telemedicine.

Goal 5.3: Create faculty and student training programs that focus on: methods of studying the uptake of interventions; theoretical models of implementation; and approaches to tailor interventions to practice and organizational settings. *(Metrics: Funded training grants to support graduate students and post-docs and K01s to support junior faculty).*

Goal 5.4: Develop and ensure sustained collaborative relationships with communities and community organizations that make implementation science possible. *(Metrics: Great reputation in the community where UA is sought out for partnerships.)*

Goal 5.5: Increase the number of federal grants and government contracts to perform implementation science from the National Institutes of Health (e.g., NIMH, NINDS, and NIDA), HRSA, the Institute for Educational Sciences, and foundations.

Goal 5.5: Recruit and name a UA faculty member to lead the Implementation Science theme under ALRI.

Goal 5.6. Work collaboratively with ORED, the Colleges and the Provost to recruit additional faculty in Implementation Science at UA.